

# SEQUENCE LISTING

<110> POLONSKY, KENNETH S.  
 HORIKAWA, YUKIO  
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 COX, NANCY J.  
 SREENAN, SEAMUS  
 ZHOU, YUN-PING  
 OTANI, KENICHI  
 HANIS, CRAIG L.  
 BELL, GRAEME I.

<120> METHODS OF TREATMENT OF TYPE 2 DIABETES

<130> ARCD:307

<140> UNKNOWN

<141> 1999-10-21

<150> 60/134,175

<151> 1999-05-13

60/105,052

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<170> PatentIn Ver. 2.0

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Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln
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Val Lys Gln Gly Leu Leu Gly Asp Cys Trp Phe Leu Cys Ala Cys Ala
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      85              90              95

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Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln
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Val Lys Gln Gly Leu Leu Gly Asp Cys Trp Phe Leu Cys Ala Cys Ala
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Ala Leu Gln Lys Ser Arg His Leu Leu Asp Gln Val Ile Pro Pro Gly
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Gln Pro Ser Trp Ala Asp Gln Glu Tyr Arg Gly Ser Phe Thr Cys Arg
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Pro Cys Leu Ala Gly Arg Leu Cys Phe Ser Arg Cys Gln Arg Glu Asp
      130            135            140

Val Phe Trp Leu Pro Leu Leu Glu Lys Val Tyr Ala Lys Val His Gly
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Ser Tyr Glu His Leu Trp Ala Gly Gln Val Ala Asp Ala Leu Val Asp
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Leu Thr Gly Gly Leu Ala Glu Arg Trp Asn Leu Lys Gly Val Ala Gly
      180            185            190

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 Cys His Thr Arg Ala Leu Pro Gly Ala Trp Val Lys Gly Gln Ser Ala  
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 385 390 395 400  
 Gly Asp Ser His Thr Ser Trp Ser Pro Ala Ser Ile Pro Gly Lys His  
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 His Ala Tyr Asp Arg Glu Val His Leu Arg Cys Glu Leu Ser Pro Gly  
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 Tyr Tyr Leu Ala Val Pro Ser Thr Phe Leu Lys Asp Ala Pro Gly Glu  
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Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln  
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Val Lys Gln Gly Leu Leu Gly Asp Cys Trp Phe Leu Cys Ala Cys Ala  
65 70 75 80

Ala Leu Gln Lys Ser Arg His Leu Leu Asp Gln Val Ile Pro Pro Gly  
85 90 95

Gln Pro Ser Trp Ala Asp Gln Glu Tyr Arg Gly Ser Phe Thr Cys Arg  
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Ile Trp Gln Phe Gly Arg Trp Val Glu Val Thr Thr Asp Asp Arg Leu  
115 120 125

Pro Cys Leu Ala Gly Arg Leu Cys Phe Ser Arg Cys Gln Arg Glu Asp  
130 135 140

Val Phe Trp Leu Pro Leu Leu Glu Lys Val Tyr Ala Lys Val His Gly  
145 150 155 160

Ser Tyr Glu His Leu Trp Ala Gly Gln Val Ala Asp Ala Leu Val Asp  
165 170 175

Leu Thr Gly Gly Leu Ala Glu Arg Trp Asn Leu Lys Gly Val Ala Gly  
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Ser Gly Gly Gln Gln Asp Arg Pro Gly Arg Trp Glu His Arg Thr Cys  
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<212> PRT

<213> Human

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      35             40            45

Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln
      50             55            60

Val Lys Gln Gly Leu Leu Gly Asp Cys Trp Phe Leu Cys Ala Cys Ala
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Pro	Cys	Leu	Ala	Gly	Arg	Leu	Cys	Phe	Ser	Arg	Cys	Gln	Arg	Glu	Asp	130	135	140
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Gly	Gly	Cys	Arg	Asn	Asn	Ser	Gly	Phe	Pro	Ser	Asn	Pro	Lys	Phe	Trp	355	360	365
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Gly Asp Ser His Thr Ser Trp Ser Pro Ala Ser Ile Pro Gly Lys His  
405 410 415

Tyr Gln Ala Val Gly Leu His Leu Trp Lys Val Glu Lys Arg Arg Val  
420 425 430

Asn Leu Pro Arg Val Leu Ser Met Pro Pro Val Ala Gly Thr Ala Cys  
435 440 445

His Ala Tyr Asp Arg Glu Val His Leu Arg Cys Glu Leu Ser Pro Gly  
450 455 460

Tyr Tyr Leu Ala Val Pro Ser Thr Phe Leu Lys Asp Ala Pro Gly Glu  
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 <212> PRT  
 <213> Human

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 Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln



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Gln Pro Ser Trp Ala Asp Gln Glu Tyr Arg Gly Ser Phe Thr Cys Arg		
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Ile Trp Gln Phe Gly Arg Trp Val Glu Val Thr Thr Asp Asp Arg Leu		
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<211> 2455

<212> DNA

<213> Human

<400> 13

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<211> 139

<212> PRT

<213> Human

<400> 14

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Pro Leu Ala Gln Phe Arg Glu Asp Ile Thr Trp Arg Arg Pro Gln Glu
      35             40            45

Ile Cys Ala Thr Pro Arg Leu Phe Pro Asp Asp Pro Arg Glu Gly Gln
      50             55            60

Val Lys Gln Gly Leu Leu Gly Asp Cys Trp Phe Leu Cys Ala Cys Ala
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Ser Pro Asp Ser Ala Thr Trp Gly Ser Trp Lys  
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35 40 45

Pro Glu Gly Gly Arg Ser Gln Asp Ala Pro Pro Leu Leu Leu Gln Glu  
50 55 60

Pro Leu Leu Ser Cys Val Pro His Arg Tyr Ala Gln Glu Val Ser Arg  
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Leu Cys Leu Leu Pro Ala Gly Thr Tyr Lys Val Val Pro Ser Thr Tyr  
85 90 95

Leu Pro Asp Thr Glu Gly Ala Phe Thr Val Thr Ile Ala Thr Arg Ile  
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Asp Arg Pro Ser Ile His Ser Gln Glu Met Leu Gly Gln Phe Leu Gln  
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Leu	Thr	Asn	Arg	Tyr	Met	Ser	Ile	Ser	Leu	Val	Thr	Ala	Ile	Ala	Val
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Ala	Ile	Cys	Tyr	Tyr	Tyr	Met	Ala	Lys	Glu	Phe	Gln	Glu	Ala	Ser	Ala
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Cys Ser Phe Val Leu Ala Leu Met Gln Lys His Arg Arg Arg Glu Arg 420 425 430		
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Trp Ser Ala Leu Leu Glu Lys Ala Tyr Ala Lys Ile Asn Gly Cys Tyr
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Arg	Leu	Glu	Ile	Cys	Asn	Leu	Thr	Pro	Asp	Thr	Leu	Thr	Ser	Asp	Thr	
			340					345					350			
Tyr	Lys	Lys	Trp	Lys	Leu	Thr	Lys	Met	Asp	Gly	Asn	Trp	Arg	Arg	Gly	
		355					360					365				
Ser	Thr	Ala	Gly	Gly	Cys	Arg	Asn	Tyr	Pro	Asn	Thr	Phe	Trp	Met	Asn	
		370				375					380					
Pro	Gln	Tyr	Leu	Ile	Lys	Leu	Glu	Glu	Glu	Asp	Glu	Asp	Glu	Glu	Asp	
385					390					395					400	
Gly	Glu	Ser	Gly	Cys	Thr	Phe	Leu	Val	Gly	Leu	Ile	Gln	Lys	His	Arg	
				405					410					415		
Arg	Arg	Gln	Arg	Lys	Met	Gly	Glu	Asp	Met	His	Thr	Ile	Gly	Phe	Gly	
				420				425					430			
Ile	Tyr	Glu	Val	Pro	Glu	Glu	Leu	Ser	Gly	Gln	Thr	Asn	Ile	His	Leu	
			435				440					445				
Ser	Lys	Asn	Phe	Phe	Leu	Thr	Asn	Arg	Ala	Arg	Glu	Arg	Ser	Asp	Thr	
		450				455					460					
Phe	Ile	Asn	Leu	Arg	Glu	Val	Leu	Asn	Arg	Phe	Lys	Leu	Pro	Pro	Gly	
465					470					475					480	
Glu	Tyr	Ile	Leu	Val	Pro	Ser	Thr	Phe	Glu	Pro	Asn	Lys	Asp	Gly	Asp	
				485					490					495		

Phe	Cys	Ile	Arg	Val	Phe	Ser	Glu	Lys	Lys	Ala	Asp	Tyr	Gln	Ala	Val	500	505	510
Asp	Asp	Glu	Ile	Glu	Ala	Asn	Leu	Glu	Glu	Phe	Asp	Ile	Ser	Glu	Asp	515	520	525
Asp	Ile	Asp	Asp	Gly	Val	Arg	Arg	Leu	Phe	Ala	Gln	Leu	Ala	Gly	Glu	530	535	540
Asp	Ala	Glu	Ile	Ser	Ala	Phe	Glu	Leu	Gln	Thr	Ile	Leu	Arg	Arg	Val	545	550	555
Leu	Ala	Lys	Arg	Gln	Asp	Ile	Lys	Ser	Asp	Gly	Phe	Ser	Ile	Glu	Thr	565	570	575
Cys	Lys	Ile	Met	Val	Asp	Met	Leu	Asp	Ser	Asp	Gly	Ser	Gly	Lys	Leu	580	585	590
Gly	Leu	Lys	Glu	Phe	Tyr	Ile	Leu	Trp	Thr	Lys	Ile	Gln	Lys	Tyr	Gln	595	600	605
Lys	Ile	Tyr	Arg	Glu	Ile	Asp	Val	Asp	Arg	Ser	Gly	Thr	Met	Asn	Ser	610	615	620
Tyr	Glu	Met	Arg	Lys	Ala	Leu	Glu	Glu	Ala	Gly	Phe	Lys	Met	Pro	Cys	625	630	635
Gln	Leu	His	Gln	Val	Ile	Val	Ala	Arg	Phe	Ala	Asp	Asp	Gln	Leu	Ile	645	650	655
Ile	Asp	Phe	Asp	Asn	Phe	Val	Arg	Cys	Leu	Val	Arg	Leu	Glu	Thr	Leu	660	665	670
Phe	Lys	Ile	Phe	Lys	Gln	Leu	Asp	Pro	Glu	Asn	Thr	Gly	Thr	Ile	Glu	675	680	685
Leu	Asp	Leu	Ile	Ser	Trp	Leu	Cys	Phe	Ser	Val	Leu					690	695	700

<210> 24  
 <211> 821  
 <212> PRT  
 <213> Human

<400> 24

Met	Pro	Thr	Val	Ile	Ser	Ala	Ser	Val	Ala	Pro	Arg	Thr	Ala	Ala	Glu	1	5	10	15
Pro	Arg	Ser	Pro	Gly	Pro	Val	Pro	His	Pro	Ala	Gln	Ser	Lys	Ala	Thr	20	25	30	
Glu	Ala	Gly	Gly	Gly	Asn	Pro	Ser	Gly	Ile	Tyr	Ser	Ala	Ile	Ile	Ser	35	40	45	
Arg	Asn	Phe	Pro	Ile	Ile	Gly	Val	Lys	Glu	Lys	Thr	Phe	Glu	Gln	Leu	50	55	60	

His	Lys	Lys	Cys	Leu	Glu	Lys	Lys	Val	Leu	Tyr	Val	Asp	Pro	Glu	Phe	65	70	75	80
Pro	Pro	Asp	Glu	Thr	Ser	Leu	Phe	Tyr	Ser	Gln	Lys	Phe	Pro	Ile	Gln	85	90	95	
Phe	Val	Trp	Lys	Arg	Pro	Pro	Glu	Ile	Cys	Glu	Asn	Pro	Arg	Phe	Ile	100	105	110	
Ile	Asp	Gly	Ala	Asn	Arg	Thr	Asp	Ile	Cys	Gln	Gly	Glu	Leu	Gly	Asp	115	120	125	
Cys	Trp	Phe	Leu	Ala	Ala	Ile	Ala	Cys	Leu	Thr	Leu	Asn	Gln	His	Leu	130	135	140	
Leu	Phe	Arg	Val	Ile	Pro	His	Asp	Gln	Ser	Phe	Ile	Glu	Asn	Tyr	Ala	145	150	155	160
Gly	Ile	Phe	His	Phe	Gln	Phe	Trp	Arg	Tyr	Gly	Glu	Trp	Val	Asp	Val	165	170	175	
Val	Ile	Asp	Asp	Cys	Leu	Pro	Thr	Tyr	Asn	Asn	Gln	Leu	Val	Phe	Thr	180	185	190	
Lys	Ser	Asn	His	Arg	Asn	Glu	Phe	Trp	Ser	Ala	Leu	Leu	Glu	Lys	Ala	195	200	205	
Tyr	Ala	Lys	Leu	His	Gly	Ser	Tyr	Glu	Ala	Leu	Lys	Gly	Gly	Asn	Thr	210	215	220	
Thr	Glu	Ala	Met	Glu	Asp	Phe	Thr	Gly	Gly	Val	Ala	Glu	Phe	Phe	Glu	225	230	235	240
Ile	Arg	Asp	Ala	Pro	Ser	Asp	Met	Tyr	Lys	Ile	Met	Lys	Lys	Ala	Ile	245	250	255	
Glu	Arg	Gly	Ser	Leu	Met	Gly	Cys	Ser	Ile	Asp	Asp	Gly	Thr	Asn	Met	260	265	270	
Thr	Tyr	Gly	Thr	Ser	Pro	Ser	Gly	Leu	Asn	Met	Gly	Glu	Leu	Ile	Ala	275	280	285	
Arg	Met	Val	Arg	Asn	Met	Asp	Asn	Ser	Leu	Leu	Gln	Asp	Ser	Asp	Leu	290	295	300	
Asp	Pro	Arg	Gly	Ser	Asp	Glu	Arg	Pro	Thr	Arg	Thr	Ile	Ile	Pro	Val	305	310	315	320
Gln	Tyr	Glu	Thr	Arg	Met	Ala	Cys	Gly	Leu	Val	Arg	Gly	His	Ala	Tyr	325	330	335	
Ser	Val	Thr	Gly	Leu	Asp	Glu	Val	Pro	Phe	Lys	Gly	Glu	Lys	Val	Lys	340	345	350	
Leu	Val	Arg	Leu	Arg	Asn	Pro	Trp	Gly	Gln	Val	Glu	Trp	Asn	Gly	Ser	355	360	365	



Trp	Ser	Asp	Arg	Trp	Lys	Asp	Trp	Ser	Phe	Val	Asp	Lys	Asp	Glu	Lys	
370						375					380					
Ala	Arg	Leu	Gln	His	Gln	Val	Thr	Glu	Asp	Gly	Glu	Phe	Trp	Met	Ser	
385					390					395					400	
Tyr	Glu	Asp	Phe	Ile	Tyr	His	Phe	Thr	Lys	Leu	Glu	Ile	Cys	Asn	Leu	
				405					410					415		
Thr	Ala	Asp	Ala	Leu	Gln	Ser	Asp	Lys	Leu	Gln	Thr	Trp	Thr	Val	Ser	
			420					425					430			
Val	Asn	Glu	Gly	Arg	Trp	Val	Arg	Gly	Cys	Ser	Ala	Gly	Gly	Cys	Arg	
		435					440					445				
Asn	Phe	Pro	Asp	Thr	Phe	Trp	Thr	Asn	Pro	Gln	Tyr	Arg	Leu	Lys	Leu	
450						455					460					
Leu	Glu	Glu	Asp	Asp	Asp	Pro	Asp	Asp	Ser	Glu	Val	Ile	Cys	Ser	Phe	
465					470					475					480	
Leu	Val	Ala	Leu	Met	Gln	Lys	Asn	Arg	Arg	Lys	Asp	Arg	Lys	Leu	Gly	
				485					490					495		
Ala	Ser	Leu	Phe	Thr	Ile	Gly	Phe	Ala	Ile	Tyr	Glu	Val	Pro	Lys	Glu	
			500					505					510			
Met	His	Gly	Asn	Lys	Gln	His	Leu	Gln	Lys	Asp	Phe	Phe	Leu	Tyr	Asn	
		515					520					525				
Ala	Ser	Lys	Ala	Arg	Ser	Lys	Thr	Tyr	Ile	Asn	Met	Arg	Glu	Val	Ser	
		530				535					540					
Gln	Arg	Phe	Arg	Leu	Pro	Pro	Ser	Glu	Tyr	Val	Ile	Val	Pro	Ser	Thr	
545					550					555					560	
Tyr	Glu	Pro	His	Gln	Glu	Gly	Glu	Phe	Ile	Leu	Arg	Val	Phe	Ser	Glu	
				565					570					575		
Lys	Arg	Asn	Leu	Ser	Glu	Glu	Val	Glu	Asn	Thr	Ile	Ser	Val	Asp	Arg	
		580						585					590			
Pro	Val	Lys	Lys	Lys	Lys	Thr	Lys	Pro	Ile	Ile	Phe	Val	Ser	Asp	Arg	
		595					600					605				
Ala	Asn	Ser	Asn	Lys	Glu	Leu	Gly	Val	Asp	Gln	Glu	Ser	Glu	Glu	Gly	
		610				615					620					
Lys	Gly	Lys	Thr	Ser	Pro	Asp	Lys	Gln	Lys	Gln	Ser	Pro	Gln	Pro	Gln	
625					630					635					640	
Pro	Gly	Ser	Ser	Asp	Gln	Glu	Ser	Glu	Glu	Gln	Gln	Gln	Phe	Arg	Asn	
				645					650					655		
Ile	Phe	Lys	Gln	Ile	Ala	Gly	Asp	Asp	Met	Glu	Ile	Cys	Ala	Asp	Glu	
			660					665					670			

Leu Lys Lys Val Leu Asn Thr Val Val Asn Lys His Lys Asp Leu Lys  
675 680 685

Thr His Gly Phe Thr Leu Glu Ser Cys Arg Ser Met Ile Ala Leu Met  
690 695 700

Asp Thr Asp Gly Ser Gly Lys Leu Asn Leu Gln Glu Phe His His Leu  
705 710 715 720

Trp Asn Lys Ile Lys Ala Trp Gln Lys Ile Phe Lys His Tyr Asp Thr  
725 730 735

Asp Gln Ser Gly Thr Ile Asn Ser Tyr Glu Met Arg Asn Ala Val Asn  
740 745 750

Asp Ala Gly Phe His Leu Asn Asn Gln Leu Tyr Asp Ile Ile Thr Met  
755 760 765

Arg Tyr Ala Asp Lys His Met Asn Ile Asp Phe Asp Ser Phe Ile Cys  
770 775 780

Cys Phe Val Arg Leu Glu Gly Met Phe Arg Ala Phe His Ala Phe Asp  
785 790 795 800

Lys Asp Gly Asp Gly Ile Ile Lys Leu Asn Val Leu Glu Trp Leu Gln  
805 810 815

Leu Thr Met Tyr Ala  
820

<210> 25

<211> 639

<212> PRT

<213> Human

<400> 25

Met Phe Ser Cys Val Lys Pro Tyr Glu Asp Gln Asn Tyr Ser Ala Leu  
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Arg Arg Asp Cys Arg Arg Arg Lys Val Leu Phe Glu Asp Pro Leu Phe  
20 25 30

Pro Ala Thr Asp Asp Ser Leu Tyr Tyr Lys Gly Thr Pro Gly Pro Ala  
35 40 45

Val Arg Arg Lys Arg Pro Lys Gly Ile Cys Glu Asp Pro Arg Leu Phe  
50 55 60

Val Asp Gly Ile Ser Ser His Asp Leu His Gln Gly Gln Val Gly Asn  
65 70 75 80

Cys Trp Phe Val Ala Ala Cys Ser Ser Leu Ala Ser Arg Glu Ser Leu  
85 90 95

Trp Gln Lys Val Ile Pro Asp Trp Lys Glu Gln Glu Trp Asp Pro Glu

100					105					110					
Lys	Pro	Asn	Ala	Tyr	Ala	Gly	Ile	Phe	His	Phe	His	Phe	Trp	Arg	Phe
		115					120					125			
Gly	Trp	Val	Asp	Val	Val	Ile	Asp	Asp	Arg	Leu	Pro	Thr	Val	Asn	Asn
	130					135					140				
Gln	Leu	Ile	Tyr	Cys	His	Ser	Asn	Ser	Arg	Asn	Glu	Phe	Trp	Cys	Ala
145					150					155					160
Leu	Val	Glu	Lys	Ala	Tyr	Ala	Lys	Leu	Ala	Gly	Cys	Tyr	Gln	Ala	Leu
				165					170					175	
Asp	Gly	Gly	Asn	Thr	Ala	Asp	Ala	Leu	Val	Asp	Phe	Thr	Gly	Gly	Val
			180					185					190		
Ser	Glu	Pro	Ile	Asp	Leu	Thr	Glu	Gly	Asp	Phe	Ala	Asn	Asp	Glu	Thr
		195					200					205			
Lys	Arg	Asn	Gln	Leu	Phe	Glu	Arg	Met	Leu	Lys	Val	His	Ser	Arg	Gly
	210					215					220				
Gly	Leu	Ile	Ser	Ala	Ser	Ile	Lys	Ala	Val	Thr	Ala	Ala	Asp	Met	Glu
225					230					235					240
Ala	Arg	Leu	Ala	Cys	Gly	Leu	Val	Lys	Gly	His	Ala	Tyr	Ala	Val	Thr
			245						250					255	
Asp	Val	Arg	Lys	Val	Arg	Leu	Gly	His	Gly	Leu	Leu	Ala	Phe	Phe	Lys
			260					265					270		
Ser	Glu	Lys	Leu	Asp	Met	Ile	Arg	Leu	Arg	Asn	Pro	Trp	Gly	Glu	Arg
		275					280					285			
Glu	Trp	Asn	Gly	Pro	Trp	Ser	Asp	Thr	Ser	Glu	Glu	Trp	Gln	Lys	Val
	290					295					300				
Ser	Lys	Ser	Glu	Arg	Glu	Lys	Met	Gly	Val	Thr	Val	Gln	Asp	Asp	Gly
305					310					315					320
Glu	Phe	Trp	Met	Thr	Phe	Glu	Asp	Val	Cys	Arg	Tyr	Phe	Thr	Asp	Ile
			325						330					335	
Ile	Lys	Cys	Arg	Val	Ile	Asn	Thr	Ser	His	Leu	Ser	Ile	His	Lys	Thr
		340					345					350			
Trp	Glu	Glu	Ala	Arg	Leu	His	Gly	Ala	Trp	Thr	Leu	His	Glu	Asp	Pro
	355						360					365			
Arg	Gln	Asn	Arg	Gly	Gly	Gly	Cys	Ile	Asn	His	Lys	Asp	Thr	Phe	Phe
	370					375					380				
Gln	Asn	Pro	Gln	Tyr	Ile	Phe	Glu	Val	Lys	Lys	Pro	Glu	Asp	Glu	Val
385					390					395					400
Leu	Ile	Cys	Ile	Gln	Gln	Arg	Pro	Lys	Arg	Ser	Thr	Arg	Arg	Glu	Gly

405										410					415				
Lys	Gly	Glu	Asn	Leu	Ala	Ile	Gly	Phe	Asp	Ile	Tyr	Lys	Val	Glu	Glu				
			420					425					430						
Asn	Arg	Gln	Tyr	Arg	Met	His	Ser	Leu	Gln	His	Lys	Ala	Ala	Ser	Ser				
		435					440					445							
Ile	Tyr	Ile	Asn	Ser	Arg	Ser	Val	Phe	Leu	Arg	Thr	Asp	Gln	Pro	Glu				
	450					455					460								
Gly	Arg	Tyr	Val	Ile	Ile	Pro	Thr	Thr	Phe	Glu	Pro	Gly	His	Thr	Gly				
465					470					475					480				
Glu	Phe	Leu	Leu	Arg	Val	Phe	Thr	Asp	Val	Pro	Ser	Asn	Cys	Arg	Glu				
				485					490					495					
Leu	Arg	Leu	Asp	Glu	Pro	Pro	His	Thr	Cys	Trp	Ser	Ser	Leu	Cys	Gly				
			500					505					510						
Tyr	Pro	Gln	Leu	Val	Thr	Gln	Val	His	Val	Leu	Gly	Ala	Ala	Gly	Leu				
		515					520					525							
Lys	Asp	Ser	Pro	Thr	Gly	Ala	Asn	Ser	Tyr	Val	Ile	Ile	Lys	Cys	Glu				
	530					535					540								
Gly	Asp	Lys	Val	Arg	Ser	Ala	Val	Gln	Lys	Gly	Thr	Ser	Thr	Pro	Glu				
545					550					555					560				
Tyr	Asn	Val	Lys	Gly	Ile	Phe	Tyr	Arg	Lys	Lys	Leu	Ser	Gln	Pro	Ile				
			565					570					575						
Thr	Val	Gln	Val	Trp	Asn	His	Arg	Val	Leu	Lys	Asp	Glu	Phe	Leu	Gly				
			580				585					590							
Gln	Val	His	Leu	Lys	Ala	Asp	Pro	Asp	Asn	Leu	Gln	Ala	Leu	His	Thr				
		595					600					605							
Leu	His	Leu	Arg	Asp	Arg	Asn	Ser	Arg	Gln	Pro	Ser	Asn	Leu	Pro	Gly				
	610					615					620								
Thr	Val	Ala	Val	His	Ile	Leu	Ser	Ser	Thr	Ser	Leu	Met	Ala	Val					
625					630					635									

<210> 26  
 <211> 641  
 <212> PRT  
 <213> Mus musculus

<400> 26  
 Met Gly Pro Pro Leu Lys Leu Phe Lys Asn Gln Lys Tyr Gln Glu Leu  
 1 5 10 15  
 Lys Gln Glu Cys Met Lys Asp Gly Arg Leu Phe Cys Asp Pro Thr Phe  
 20 25 30

Leu Pro Glu Asn Asp Ser Leu Phe Phe Asn Arg Leu Leu Pro Gly Lys  
 35 40 45  
 Val Val Trp Lys Arg Pro Gln Asp Ile Ser Asp Asp Pro His Leu Ile  
 50 55 60  
 Val Gly Asn Ile Ser Asn His Gln Leu Ile Gln Gly Arg Leu Gly Asn  
 65 70 75 80  
 Lys Ala Met Ile Ser Ala Phe Ser Cys Leu Ala Val Gln Glu Ser His  
 85 90 95  
 Trp Thr Lys Ala Ile Pro Asn His Lys Asp Gln Glu Trp Asp Pro Arg  
 100 105 110  
 Lys Pro Glu Lys Tyr Ala Gly Ile Phe His Phe Arg Phe Trp His Phe  
 115 120 125  
 Gly Glu Trp Thr Glu Val Val Ile Asp Asp Leu Leu Pro Thr Ile Asn  
 130 135 140  
 Gly Asp Leu Val Phe Ser Phe Ser Thr Ser Met Asn Glu Phe Trp Asn  
 145 150 155 160  
 Ala Leu Leu Glu Lys Ala Tyr Ala Lys Leu Leu Gly Cys Tyr Glu Ala  
 165 170 175  
 Leu Asp Gly Leu Thr Ile Thr Asp Ile Ile Met Asp Phe Thr Gly Thr  
 180 185 190  
 Leu Ala Glu Ile Ile Asp Met Gln Lys Gly Arg Tyr Thr Asp Leu Val  
 195 200 205  
 Glu Glu Lys Tyr Lys Leu Phe Gly Glu Leu Tyr Lys Thr Phe Thr Lys  
 210 215 220  
 Gly Gly Leu Ile Cys Cys Ser Ile Glu Ser Pro Ser Gln Glu Glu Gln  
 225 230 235 240  
 Glu Val Glu Thr Asp Trp Gly Leu Leu Lys Gly Tyr Thr Tyr Thr Met  
 245 250 255  
 Thr Asp Ile Arg Lys Leu Arg Leu Gly Glu Arg Leu Val Glu Val Phe  
 260 265 270  
 Ser Thr Glu Lys Leu Tyr Met Val Arg Leu Arg Asn Pro Leu Gly Arg  
 275 280 285  
 Gln Glu Trp Ser Gly Pro Trp Ser Glu Ile Ser Glu Glu Trp Gln Gln  
 290 295 300  
 Leu Thr Val Thr Asp Arg Lys Asn Leu Gly Leu Val Met Ser Asp Asp  
 305 310 315 320  
 Gly Glu Phe Trp Met Ser Leu Glu Asp Phe Cys His Asn Phe His Lys  
 325 330 335

Leu Asn Val Cys Arg Asn Val Asn Asn Pro Val Phe Gly Arg Lys Glu  
 340 345 350  
 Leu Glu Ser Val Val Gly Cys Trp Thr Val Asp Asp Asp Pro Leu Met  
 355 360 365  
 Asn Arg Ser Gly Gly Cys Tyr Asn Asn Arg Asp Thr Phe Leu Gln Asn  
 370 375 380  
 Pro Gln Tyr Ile Phe Thr Val Pro Glu Asp Gly His Lys Val Ile Met  
 385 390 395 400  
 Ser Leu Gln Gln Lys Asp Leu Arg Thr Tyr Arg Arg Met Gly Arg Pro  
 405 410 415  
 Asp Asn Tyr Ile Ile Gly Phe Glu Leu Phe Lys Val Glu Met Asn Arg  
 420 425 430  
 Arg Phe Arg Leu His His Leu Tyr Ile Gln Glu Arg Ala Gly Thr Ser  
 435 440 445  
 Thr Tyr Ile Asp Thr Arg Thr Val Phe Leu Ser Lys Tyr Leu Lys Lys  
 450 455 460  
 Gly Ser Tyr Val Leu Val Pro Thr Met Phe Gln His Gly Arg Thr Ser  
 465 470 475 480  
 Glu Phe Leu Leu Arg Ile Phe Ser Glu Val Pro Val Gln Leu Arg Glu  
 485 490 495  
 Leu Thr Leu Asp Met Pro Lys Met Ser Cys Trp Asn Leu Ala Arg Gly  
 500 505 510  
 Tyr Pro Lys Val Val Thr Gln Ile Thr Val His Ser Ala Glu Gly Leu  
 515 520 525  
 Glu Lys Lys Tyr Ala Asn Glu Thr Val Asn Pro Tyr Leu Ile Ile Lys  
 530 535 540  
 Cys Gly Lys Glu Glu Val Arg Ser Pro Val Gln Lys Asn Thr Val His  
 545 550 555 560  
 Ala Ile Phe Asp Thr Gln Ala Val Phe Tyr Arg Arg Thr Thr Asp Ile  
 565 570 575  
 Pro Ile Ile Ile Gln Val Trp Asn Ser Arg Lys Phe Cys Asp Gln Phe  
 580 585 590  
 Leu Gly Gln Val Thr Leu Asp Ala Asp Pro Ser Asp Cys Arg Asp Leu  
 595 600 605  
 Lys Ser Leu Tyr Leu Arg Lys Lys Gly Gly Pro Thr Ala Lys Val Lys  
 610 615 620  
 Gln Gly His Ile Ser Phe Lys Val Ile Ser Ser Asp Asp Leu Thr Glu  
 625 630 635 640

Leu

<210> 27  
<211> 703  
<212> PRT  
<213> RAT

<400> 27

Met Ala Ala Leu Ala Ala Gly Val Ser Lys Gln Arg Ala Val Ala Glu  
1 5 10 15  
Gly Leu Gly Ser Asn Gln Asn Ala Val Lys Tyr Leu Gly Gln Asp Phe  
20 25 30  
Glu Thr Leu Arg Lys Gln Cys Leu Asn Ser Gly Val Leu Phe Lys Asp  
35 40 45  
Pro Glu Phe Pro Ala Cys Pro Ser Ala Leu Gly Tyr Lys Asp Leu Gly  
50 55 60  
Pro Gly Ser Pro Asp Thr Gln Gly Ile Val Trp Lys Arg Pro Thr Glu  
65 70 75 80  
Leu Cys Pro Asn Pro Gln Phe Ile Val Gly Gly Ala Thr Arg Thr Asp  
85 90 95  
Ile Arg Gln Gly Gly Leu Gly Asp Cys Trp Leu Leu Ala Ala Ile Ala  
100 105 110  
Ser Leu Thr Leu Asn Glu Lys Leu Leu Tyr Arg Val Leu Pro Arg Asp  
115 120 125  
Gln Ser Phe Gln Lys Asp Tyr Ala Gly Ile Phe His Phe Gln Phe Trp  
130 135 140  
Gln Tyr Gly Glu Trp Val Glu Val Val Ile Asp Asp Arg Leu Pro Thr  
145 150 155 160  
Lys Asn Gly Gln Leu Leu Phe Leu His Ser Glu Glu Gly Asn Glu Phe  
165 170 175  
Trp Ser Ala Leu Leu Glu Lys Ala Tyr Ala Lys Leu Asn Gly Ser Tyr  
180 185 190  
Glu Ala Leu Val Gly Gly Ser Thr Ile Glu Gly Phe Glu Asp Phe Thr  
195 200 205  
Gly Gly Ile Ser Glu Phe Tyr Asp Leu Lys Lys Pro Pro Glu Asn Leu  
210 215 220  
Tyr Tyr Ile Ile Gln Lys Ala Leu Arg Lys Gly Ser Leu Leu Gly Cys  
225 230 235 240  
Ser Ile Asp Val Ser Thr Ala Ala Glu Ala Glu Ala Thr Thr Arg Gln  
245 250 255

Lys Leu Val Lys Gly His Ala Tyr Ser Val Thr Gly Val Glu Glu Val  
 260 265 270  
 Asn Phe His Gly Arg Pro Glu Lys Leu Ile Arg Leu Arg Asn Pro Trp  
 275 280 285  
 Gly Glu Val Glu Trp Ser Gly Ala Trp Ser Asp Asn Ala Pro Glu Trp  
 290 295 300  
 Asn Tyr Ile Asp Pro Arg Arg Lys Glu Glu Leu Asp Lys Lys Ala Glu  
 305 310 315 320  
 Asp Gly Glu Phe Trp Met Ser Phe Ser Asp Phe Leu Lys Gln Tyr Ser  
 325 330 335  
 Arg Leu Glu Ile Cys Asn Leu Ser Pro Asp Ser Leu Ser Ser Glu Glu  
 340 345 350  
 Ile His Lys Trp Asn Leu Val Leu Phe Asn Gly Arg Trp Thr Arg Gly  
 355 360 365  
 Ser Thr Ala Gly Gly Cys Leu Asn Tyr Pro Gly Thr Tyr Trp Thr Asn  
 370 375 380  
 Pro Gln Phe Lys Ile His Leu Asp Glu Val Asp Glu Asp Gln Glu Glu  
 385 390 395 400  
 Gly Thr Ser Glu Pro Cys Cys Thr Val Leu Leu Gly Leu Met Gln Lys  
 405 410 415  
 Asn Arg Arg Arg Gln Lys Arg Ile Gly Gln Gly Met Leu Ser Ile Gly  
 420 425 430  
 Tyr Ala Val Tyr Gln Ile Pro Lys Glu Leu Glu Ser His Thr Asp Ala  
 435 440 445  
 His Leu Gly Arg Asp Phe Phe Leu Gly Arg Gln Pro Ser Thr Cys Ser  
 450 455 460  
 Ser Thr Tyr Met Asn Leu Arg Glu Val Ser Ser Arg Val Arg Leu Pro  
 465 470 475 480  
 Pro Gly Gln Tyr Leu Val Val Pro Ser Thr Phe Glu Pro Phe Lys Asp  
 485 490 495  
 Gly Asp Phe Cys Leu Arg Val Phe Ser Glu Lys Lys Ala Lys Ala Leu  
 500 505 510  
 Glu Ile Gly Asp Thr Val Ser Gly His Pro His Glu Pro His Pro Arg  
 515 520 525  
 Asp Met Asp Glu Glu Asp Glu His Val Arg Ser Leu Phe Glu Glu Phe  
 530 535 540  
 Val Gly Lys Asp Ser Glu Ile Ser Ala Asn Gln Leu Lys Arg Val Leu  
 545 550 555 560



Asn Glu Val Leu Ser Lys Arg Thr Asp Met Lys Phe Asp Gly Phe Asn  
565 570 575

Ile Asn Thr Cys Arg Glu Met Ile Ser Leu Leu Asp Ser Asp Gly Thr  
580 585 590

Gly Ser Leu Gly Pro Met Glu Phe Lys Thr Leu Trp Leu Lys Ile Arg  
595 600 605

Thr Tyr Leu Glu Ile Phe Gln Glu Met Asp His Asn His Val Gly Thr  
610 615 620

Ile Glu Ala His Glu Met Arg Thr Ala Leu Lys Lys Ala Gly Phe Thr  
625 630 635 640

Leu Asn Asn Gln Val Gln Gln Thr Ile Ala Met Arg Tyr Ala Cys Ser  
645 650 655

Lys Leu Gly Val Asp Phe Asn Gly Phe Val Ala Cys Met Ile Arg Leu  
660 665 670

Glu Thr Leu Phe Lys Leu Phe Arg Leu Leu Asp Lys Asp Gln Asn Gly  
675 680 685

Ile Val Gln Leu Ser Leu Ala Glu Trp Leu Cys Cys Val Leu Val  
690 695 700

<210> 28

<211> 690

<212> PRT

<213> Human

<400> 28

Met Pro Tyr Leu Tyr Arg Ala Pro Gly Pro Gln Ala His Pro Val Pro  
1 5 10 15

Lys Asp Ala Arg Ile Thr His Ser Ser Gly Gln Ser Phe Glu Gln Met  
20 25 30

Arg Gln Glu Cys Leu Gln Arg Gly Thr Leu Phe Glu Asp Ala Asp Phe  
35 40 45

Pro Ala Ser Asn Ser Ser Leu Phe Tyr Ser Glu Arg Pro Gln Ile Pro  
50 55 60

Phe Val Trp Lys Arg Pro Gly Glu Ile Val Lys Asn Pro Glu Phe Ile  
65 70 75 80

Leu Gly Gly Ala Thr Arg Thr Asp Ile Cys Gln Gly Glu Leu Gly Asp  
85 90 95

Cys Trp Leu Leu Ala Ala Ile Ala Ser Leu Thr Leu Asn Gln Lys Ala  
100 105 110

Leu Ala Arg Val Ile Pro Gln Asp Gln Ser Phe Gly Pro Gly Tyr Ala

115					120					125					
Gly	Ile	Phe	His	Phe	Gln	Phe	Trp	Gln	His	Ser	Glu	Trp	Leu	Asp	Val
130						135					140				
Val	Ile	Asp	Asp	Arg	Leu	Pro	Thr	Phe	Arg	Asp	Arg	Leu	Val	Phe	Leu
145					150					155					160
His	Ser	Ala	Asp	His	Asn	Glu	Phe	Trp	Ser	Ala	Leu	Leu	Glu	Lys	Ala
				165					170					175	
Tyr	Ala	Lys	Leu	Asn	Gly	Ser	Tyr	Glu	Ala	Leu	Lys	Gly	Gly	Ser	Ala
			180					185					190		
Ile	Glu	Ala	Met	Glu	Asp	Phe	Thr	Gly	Gly	Val	Ala	Glu	Thr	Phe	Gln
		195					200					205			
Thr	Lys	Glu	Ala	Pro	Glu	Asn	Phe	Tyr	Glu	Ile	Leu	Glu	Lys	Ala	Leu
	210					215					220				
Lys	Arg	Gly	Ser	Leu	Leu	Gly	Cys	Phe	Ile	Asp	Thr	Arg	Ser	Ala	Ala
225					230					235					240
Glu	Ser	Glu	Ala	Arg	Thr	Pro	Phe	Gly	Leu	Ile	Lys	Gly	His	Ala	Tyr
				245					250					255	
Ser	Val	Thr	Gly	Ile	Asp	Gln	Val	Ser	Phe	Arg	Gly	Gln	Arg	Ile	Glu
			260					265					270		
Leu	Ile	Arg	Ile	Arg	Asn	Pro	Trp	Gly	Gln	Val	Glu	Trp	Asn	Gly	Ser
		275					280					285			
Trp	Ser	Asp	Ser	Ser	Pro	Glu	Trp	Arg	Ser	Val	Gly	Pro	Ala	Glu	Gln
	290					295					300				
Lys	Arg	Leu	Cys	His	Thr	Ala	Leu	Asp	Asp	Gly	Glu	Phe	Trp	Met	Ala
305					310					315					320
Phe	Lys	Asp	Phe	Lys	Ala	His	Phe	Asp	Lys	Val	Glu	Ile	Cys	Asn	Leu
				325					330					335	
Thr	Pro	Asp	Ala	Leu	Glu	Glu	Asp	Ala	Ile	His	Lys	Trp	Glu	Val	Thr
			340					345					350		
Val	His	Gln	Gly	Ser	Trp	Val	Arg	Gly	Ser	Thr	Ala	Gly	Gly	Cys	Arg
		355					360					365			
Asn	Phe	Leu	Asp	Thr	Phe	Trp	Thr	Asn	Pro	Gln	Ile	Lys	Leu	Ser	Leu
	370					375					380				
Thr	Glu	Lys	Asp	Glu	Gly	Gln	Glu	Glu	Cys	Ser	Phe	Leu	Val	Ala	Leu
385					390					395					400
Met	Gln	Lys	Asp	Arg	Arg	Lys	Leu	Lys	Arg	Phe	Gly	Ala	Asn	Val	Leu
				405					410					415	
Thr	Ile	Gly	Tyr	Ala	Ile	Tyr	Glu	Cys	Pro	Asp	Lys	Asp	Glu	His	Leu

420	425	430
Asn Lys Asp Phe Phe Arg Tyr His Ala Ser Arg Ala Arg Ser Lys Thr		
435	440	445
Phe Ile Asn Leu Arg Glu Val Ser Asp Arg Phe Lys Leu Pro Pro Gly		
450	455	460
Glu Tyr Ile Leu Ile Pro Ser Thr Phe Glu Pro His Gln Glu Ala Asp		
465	470	475
Phe Cys Leu Arg Ile Phe Ser Glu Lys Lys Ala Ile Thr Arg Asp Met		
485	490	495
Asp Gly Asn Val Asp Ile Asp Leu Pro Glu Pro Pro Lys Pro Thr Pro		
500	505	510
Pro Asp Gln Glu Thr Glu Glu Glu Gln Arg Phe Arg Ala Leu Phe Glu		
515	520	525
Gln Val Ala Gly Glu Asp Met Glu Val Thr Ala Glu Glu Leu Glu Tyr		
530	535	540
Val Leu Asn Ala Val Leu Gln Lys Lys Lys Asp Ile Lys Phe Lys Lys		
545	550	555
Leu Ser Leu Ile Ser Cys Lys Asn Ile Ile Ser Leu Met Asp Thr Ser		
565	570	575
Gly Asn Gly Lys Leu Glu Phe Asp Glu Phe Lys Val Phe Trp Asp Lys		
580	585	590
Leu Lys Gln Trp Ile Asn Leu Phe Leu Arg Phe Asp Ala Asp Lys Ser		
595	600	605
Gly Thr Met Ser Thr Tyr Glu Leu Arg Thr Ala Leu Lys Ala Ala Gly		
610	615	620
Phe Gln Leu Ser Ser His Leu Leu Gln Leu Ile Val Leu Arg Tyr Ala		
625	630	635
Asp Glu Glu Leu Gln Leu Asp Phe Asp Asp Phe Leu Asn Cys Leu Val		
645	650	655
Arg Leu Glu Asn Ala Ser Arg Val Phe Gln Ala Leu Ser Thr Lys Asn		
660	665	670
Lys Glu Phe Ile His Leu Asn Ile Asn Glu Phe Ile His Leu Thr Met		
675	680	685
Asn Ile		
690		

<210> 29  
 <211> 29  
 <212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
Primer

<400> 29

tctcagagtg gggtgaggct gtgatgggg

29

<210> 30

<211> 6

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
Primer

<400> 30

aataaa

6

1